

Design and Construction of Creekside Town Center Bridges

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Reid Middleton, Inc.

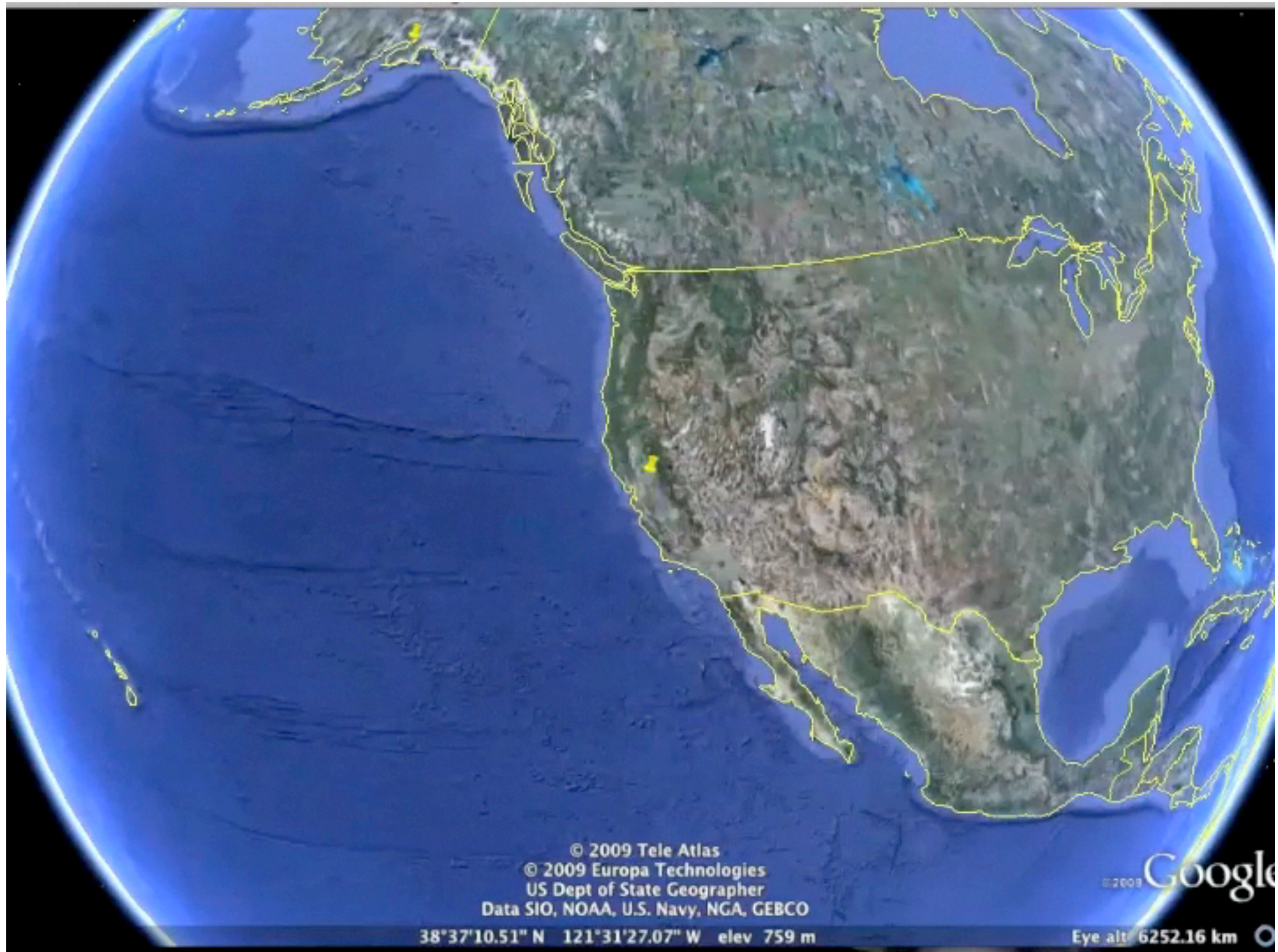


Reid Middleton

- Based in Everett, Washington with an office in Anchorage, AK
- Approx. 100 employees total
- Anchorage Office
 - Structural Concentration
 - Four Professional Engineers, Two EITs and Two support staff

Creekside Town Center Bridges

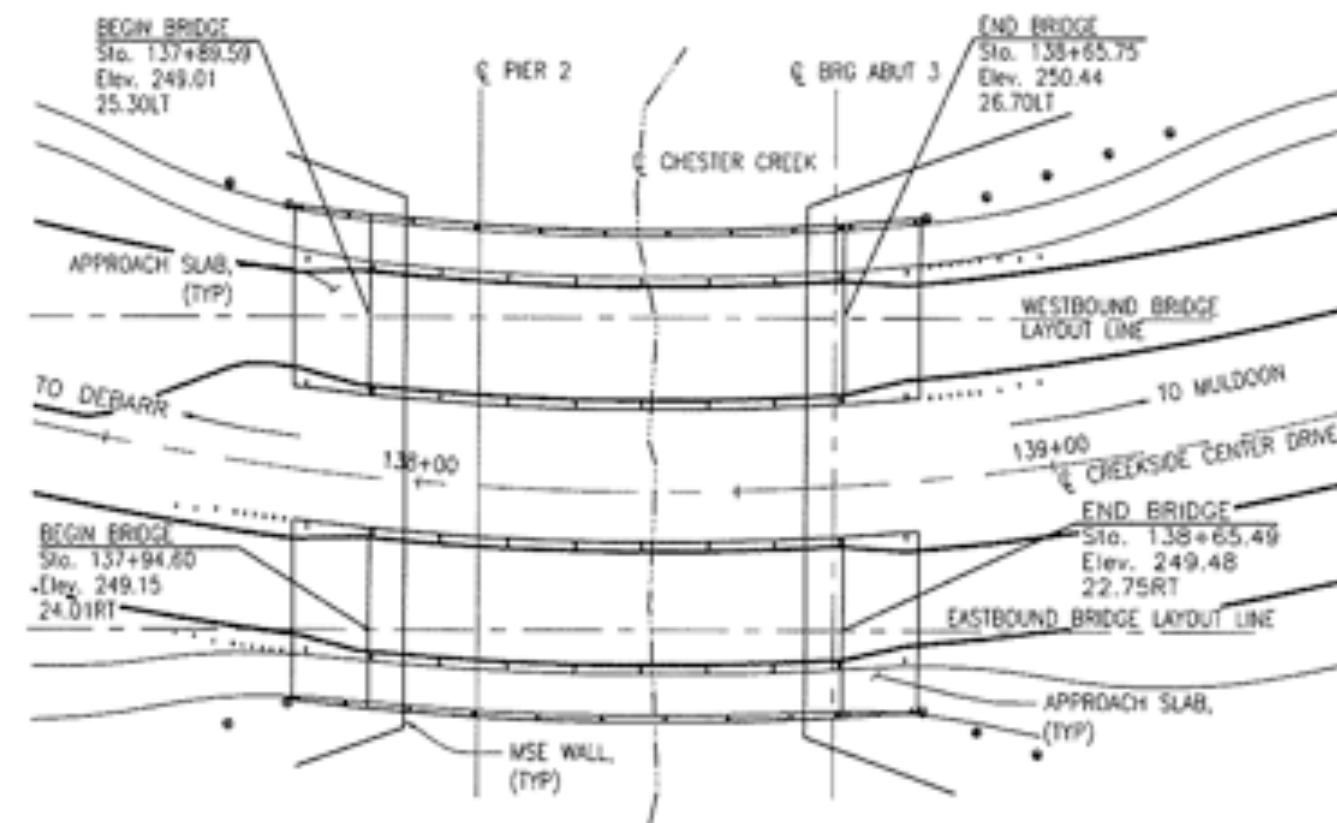
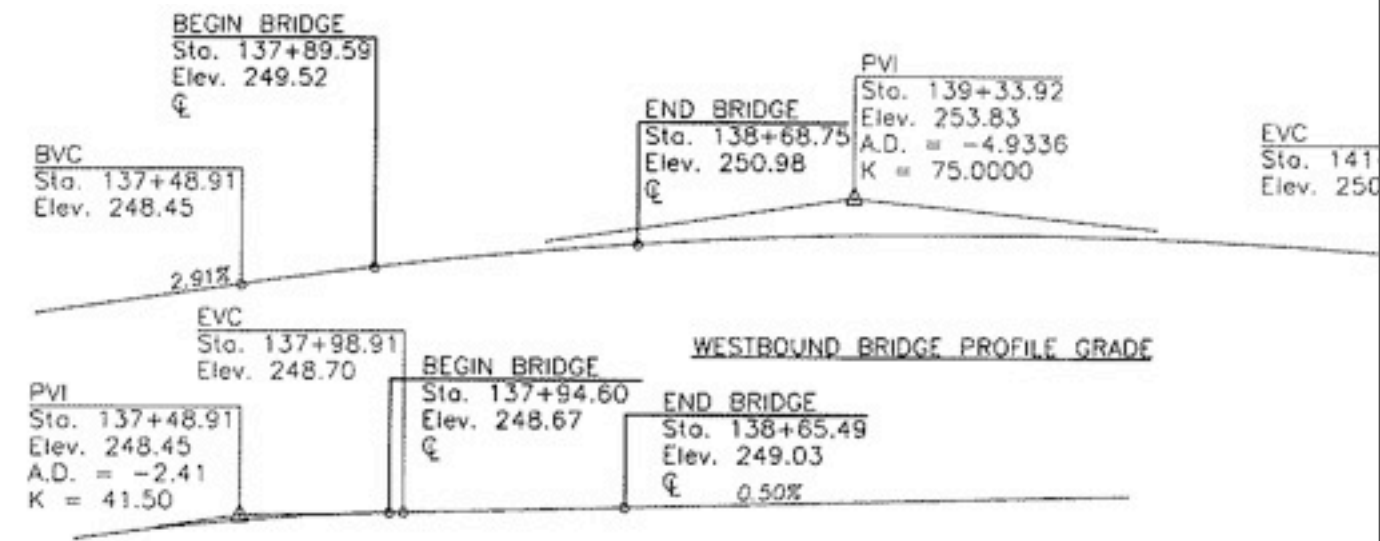
- Community revitalization/renovation type of project
- Adjacent to Begich Middle School
- Engineer's Estimate for Bridge work: \$1,378,025.00 - \$320/ft²
- Bids ranged from: \$1,432,301.50 to \$1,616,630.00 - \$330 to \$375/ft²
- Winning Bid: \$1,445,606.70 - \$335/ft²



Creekside Town Center Location

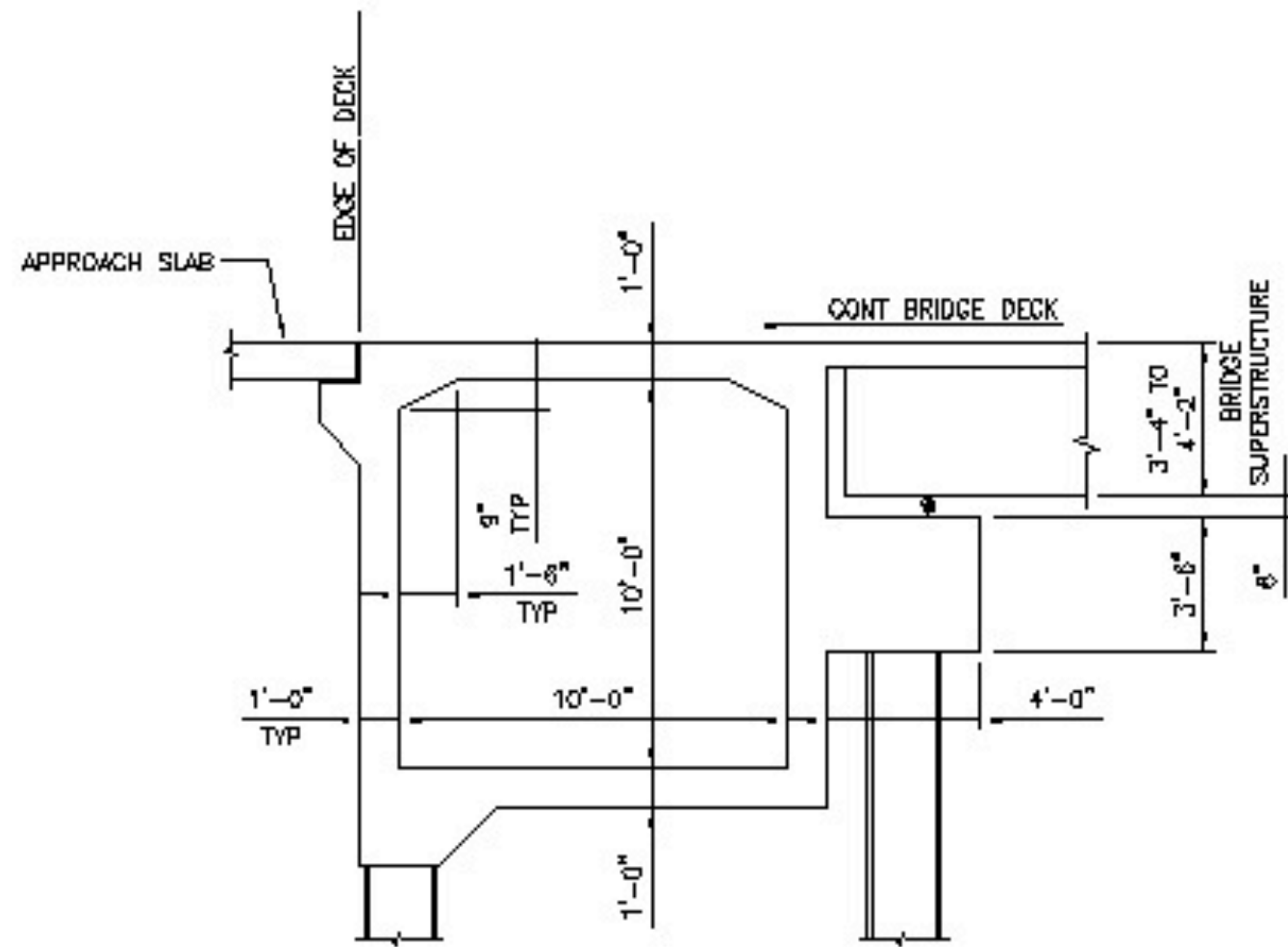
Design Challenges

- Geometry Challenges
 - Eastbound and Westbound Vertical Profiles different
 - Horizontally Curved
 - Pedestrian Undercrossing on the Northwest side



Design Challenges

- Early (prior to 2007) concept
- Final Design



Design Concerns

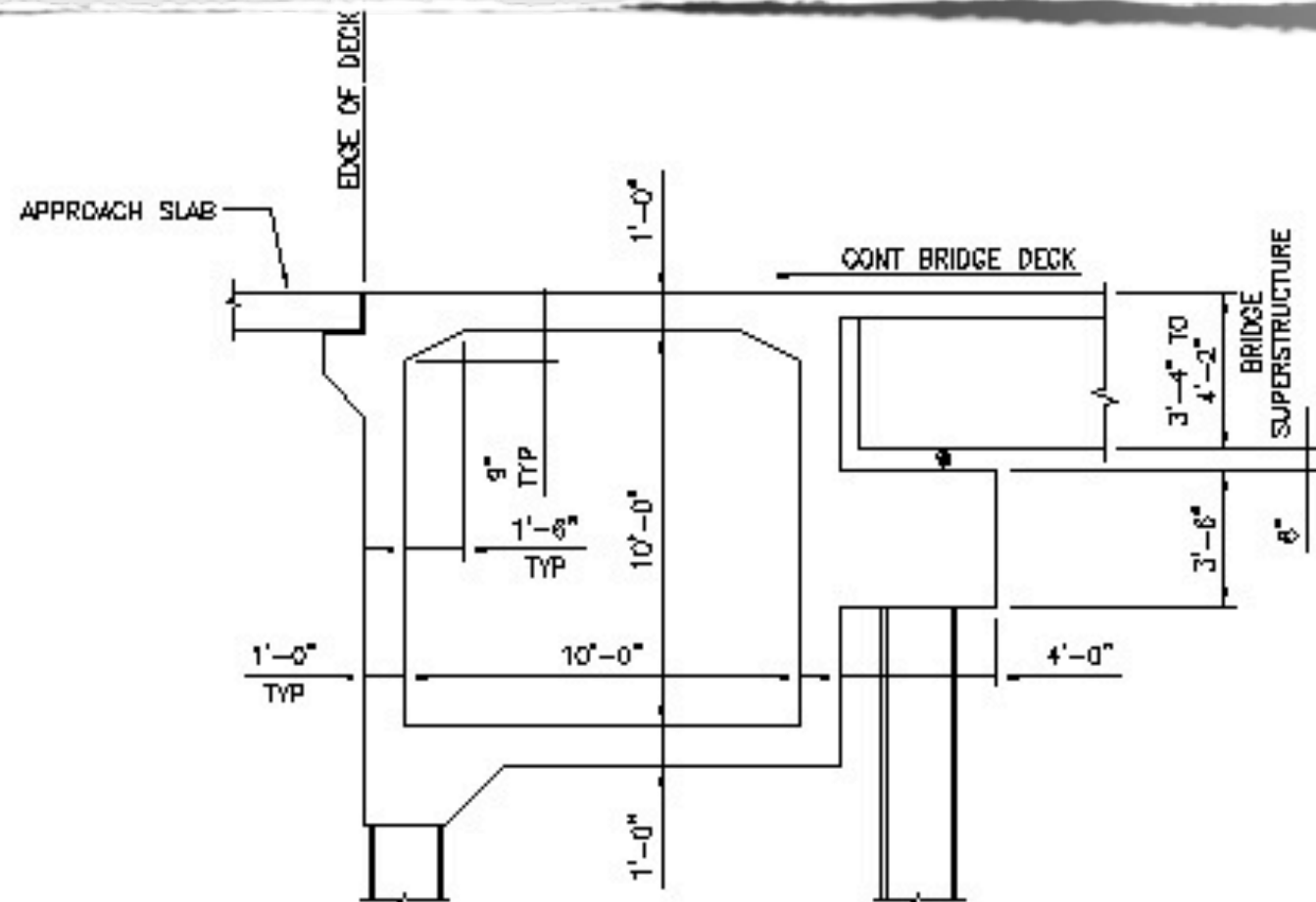
- Design Code
 - AASHTO 15th and 16th were available in our library
 - There was a general lack of preference expressed by the owners

Design Concerns

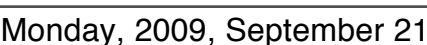
- Foundation type

Via e-mail dated July 16, 2007:

“Spread Footings at the Bridge: I spoke with ...our GeoTech department and the recommendation for spread footings were based on the dense gravel at the site. No deep borings were done because of this finding. If [deep foundations] are used.... deep borings will be required. I do not believe our time line allows for this.”



- Seismic Zone 4
- Irregular Bridge
- Frozen ground case increases shear demand per AASHTO LRFD Article 3.10.9.4.3.a
- As per the Alaska DOT “Seismic Pier Design for Steel Pipe Pile Extensions with Concrete Cap Beam”

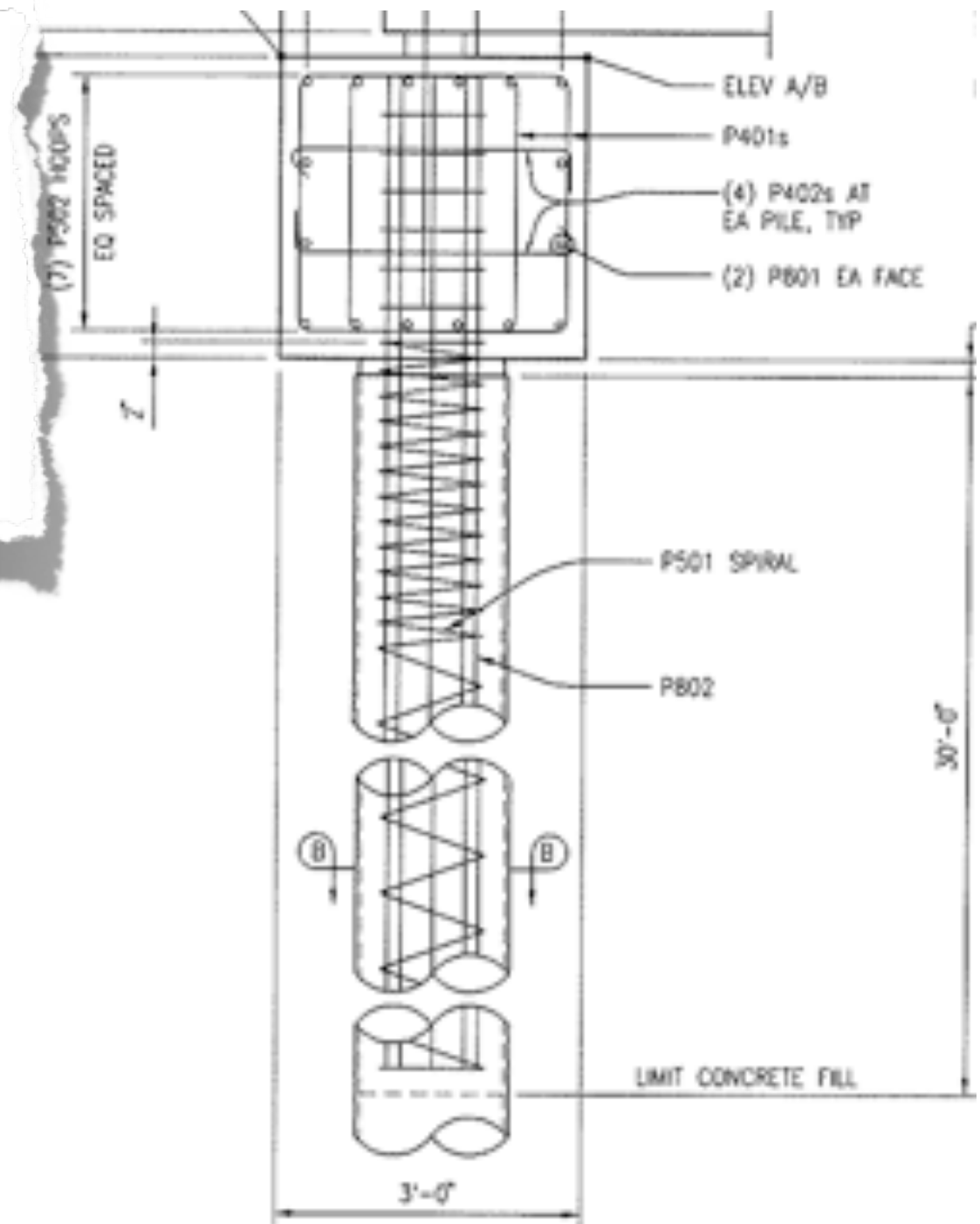


Design Concerns

3.10.9.4.3a General

Where inelastic hinging is invoked as a basis for seismic design, the force effects resulting from plastic hinging at the top and/or bottom of the column shall be calculated after the preliminary design of the columns has been completed utilizing the modified design forces specified in Article 3.10.9.4.2 as the seismic loads. The consequential forces resulting from plastic hinging shall

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Design Concerns

- Electrical Concerns



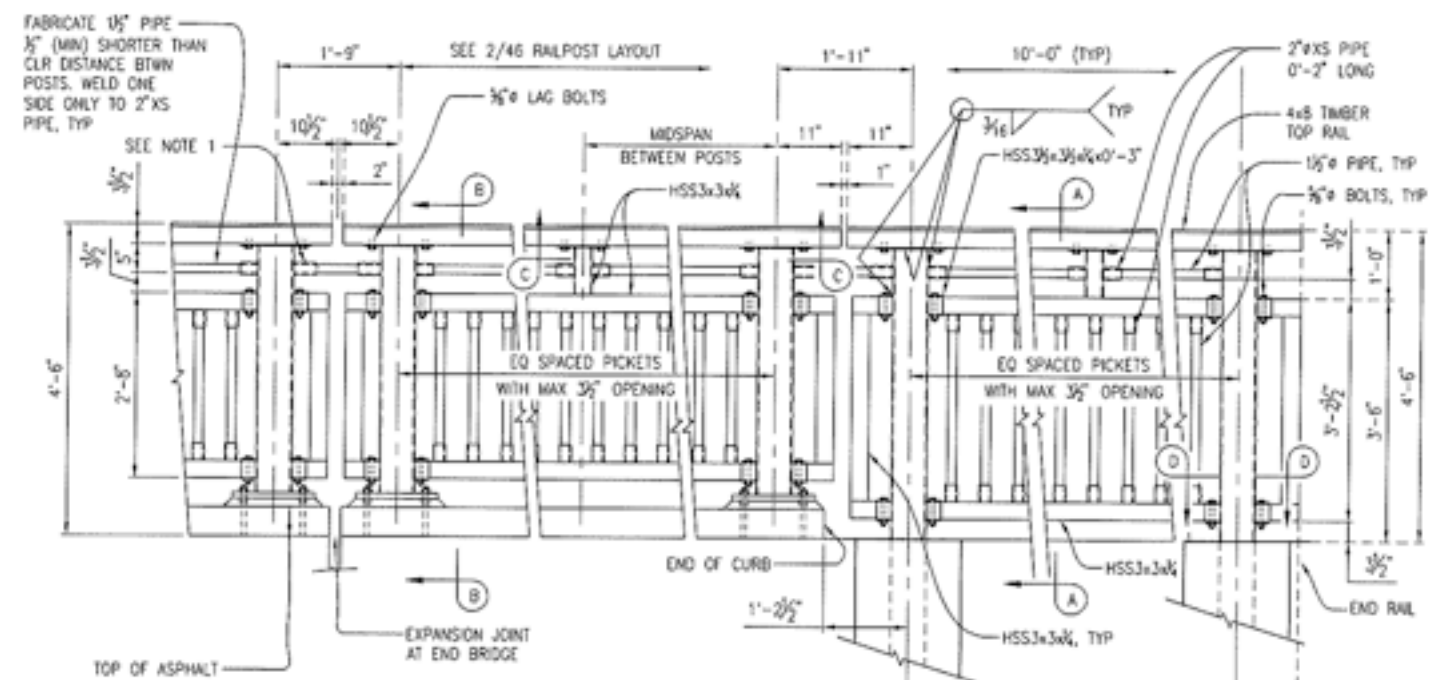
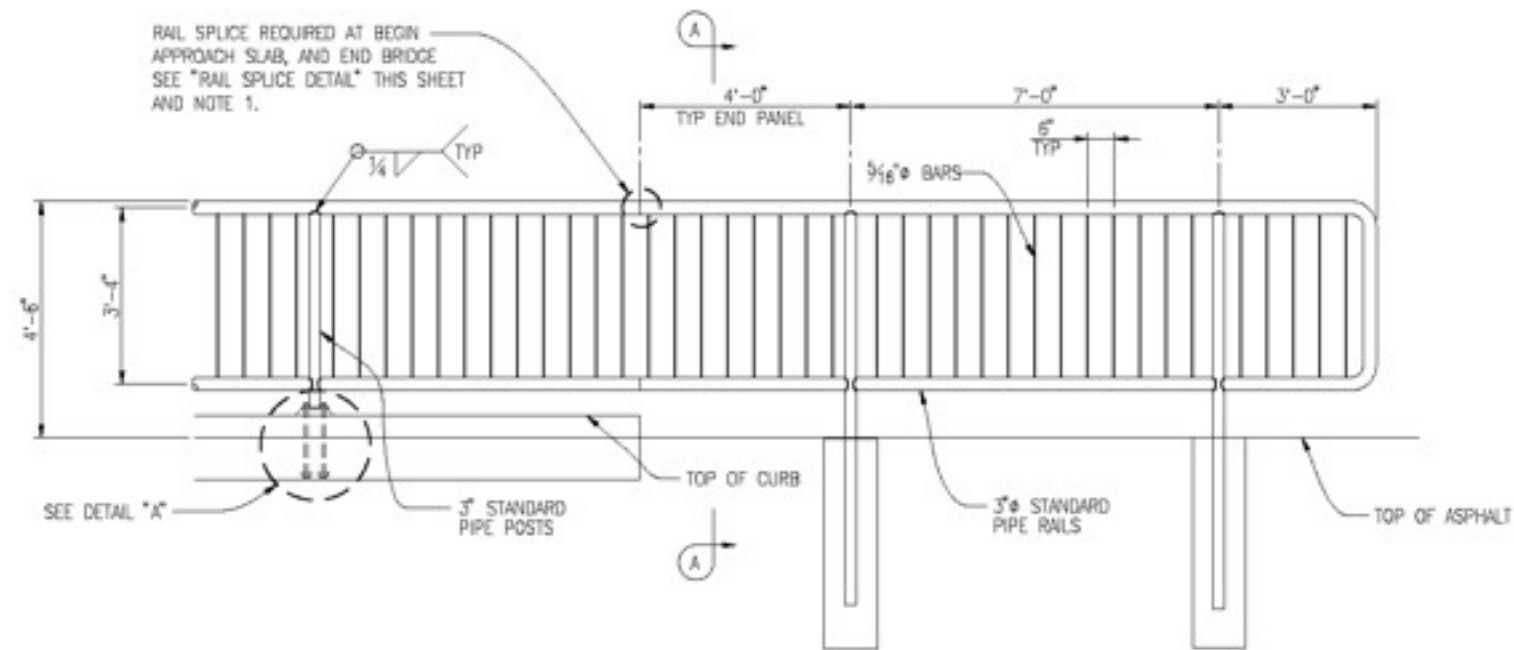
Design Concerns

- Architectural Concerns



Design Concerns

- Architectural Concerns
- Pedestrian Railing





Original Site

Driving Piles

- Boulder encountered while driving affecting two piles
- 24" diameter casing was installed to the boulder
- Boulder was drilled to allow 18" diameter pile installation
- Annulus between the 18" pile and the casing was filled with a Bentonite Slurry.





Casting the last Precast Girders at AggPro — August 5, 2008



Piles Driven, Concrete
cores cast, MSE Wall

August 13, 2008



Site Condition in August 13, 2008



Forming up Piers and Abutment - August 18, 2008



Pier 2 Formwork

August 18, 2008



Temporary Bridge

August 18, 2008



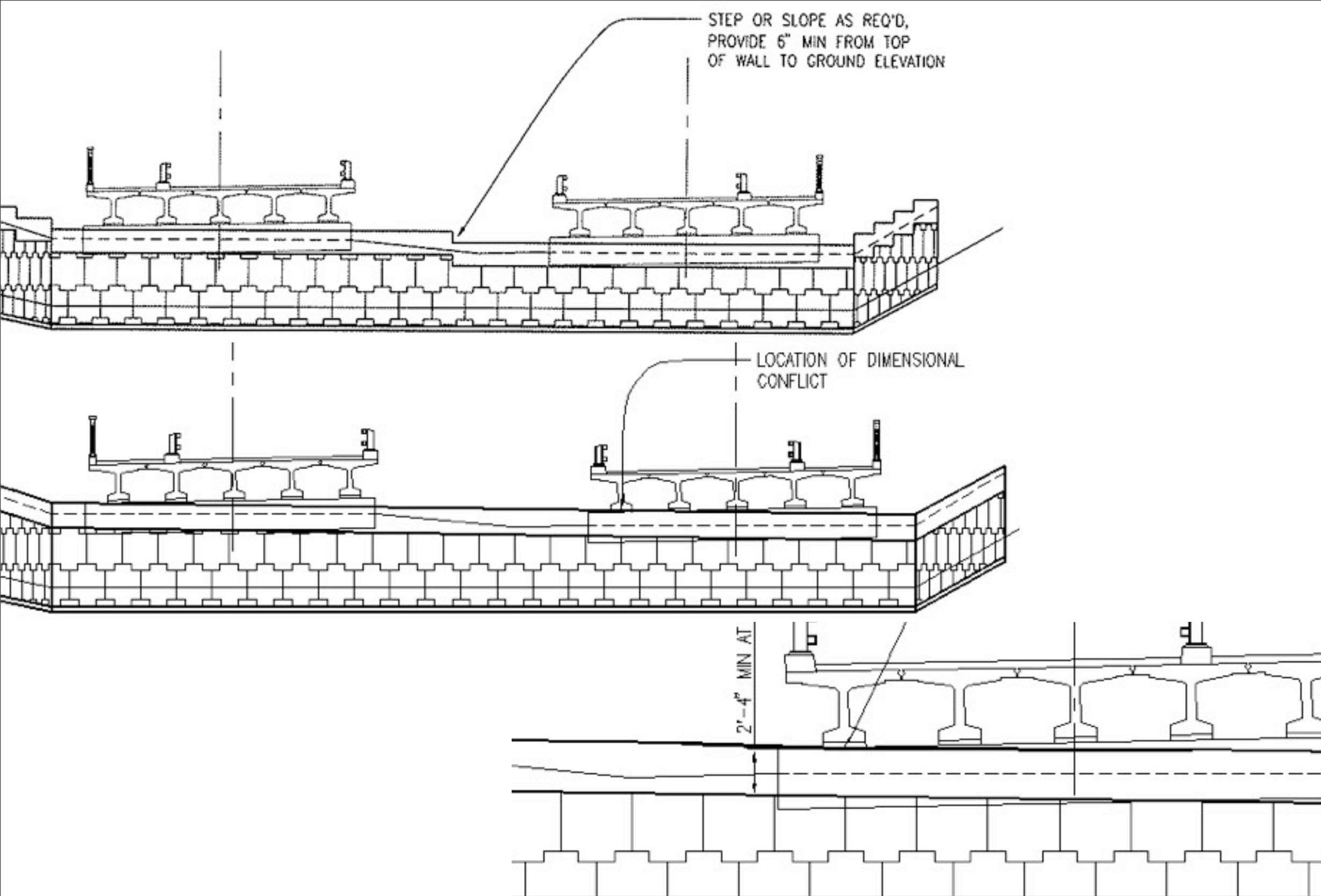
Forming Abutment 1, MSE Coping

August 26, 2008



Profile

August 26, 2008



Coping Interference

Mid August



Dip in Coping

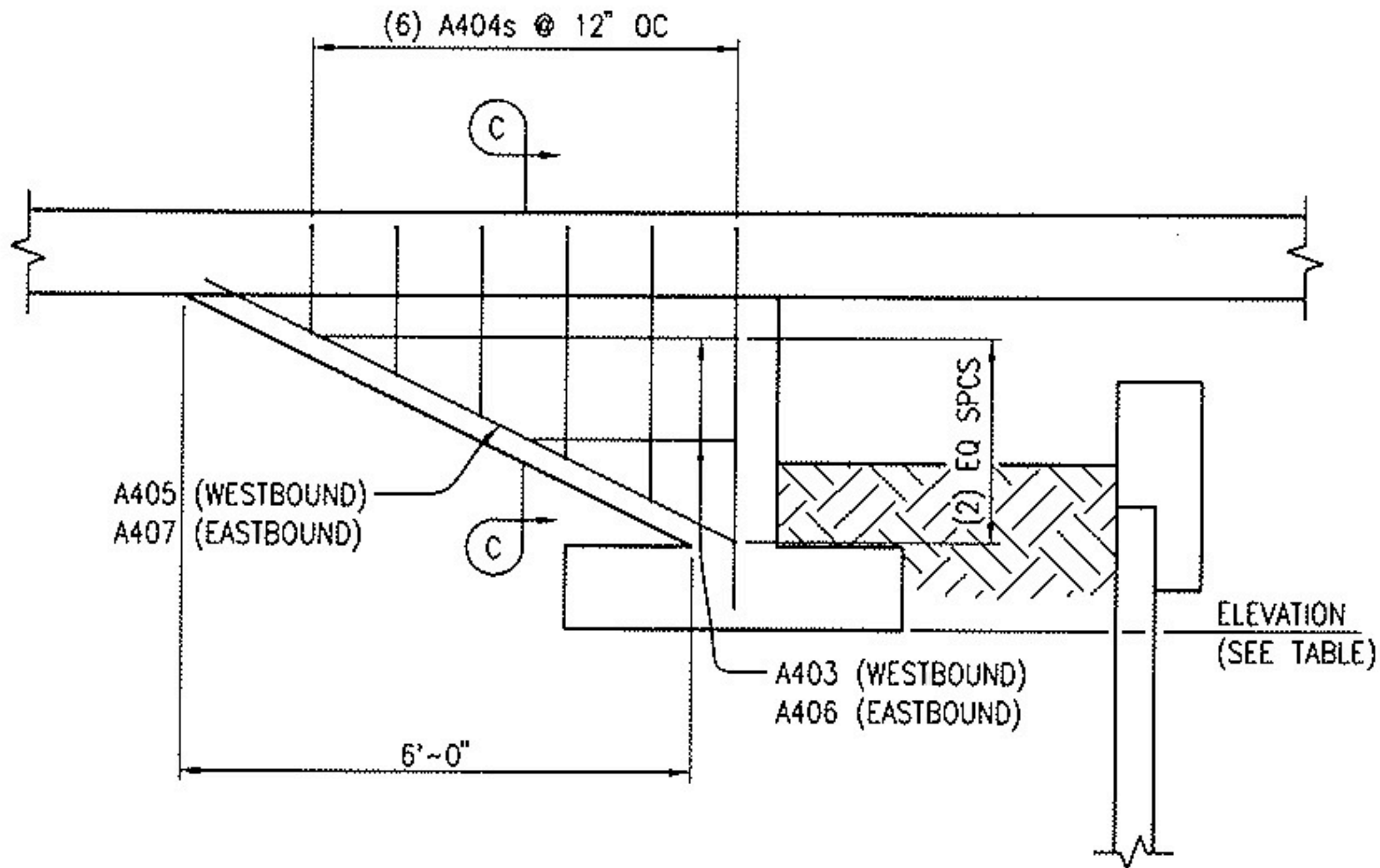
August 26, 2008



September 8, 2008 — Girders set
Final Girder Cast, August 5, 2008 less than 5 weeks prior



Shear Tab Detail — Welded shear tab and shear key to be grouted
September 8, 2008



Elevation of Abutment 1

September 9, 2008



Abutment 1 Extension

September 9, 2009



Deck Bulb-T Damaged

September 10, 2008



Pier Diaphragms Cast

September 16, 2008



Decked Bulb-T Girder Repair
September 16, 2008



Blockouts for Railing Anchors

September 16, 2008



Casting South Diaphragm

September 19, 2008



Installing Forgotten Railing Base Plates

September 19, 2008



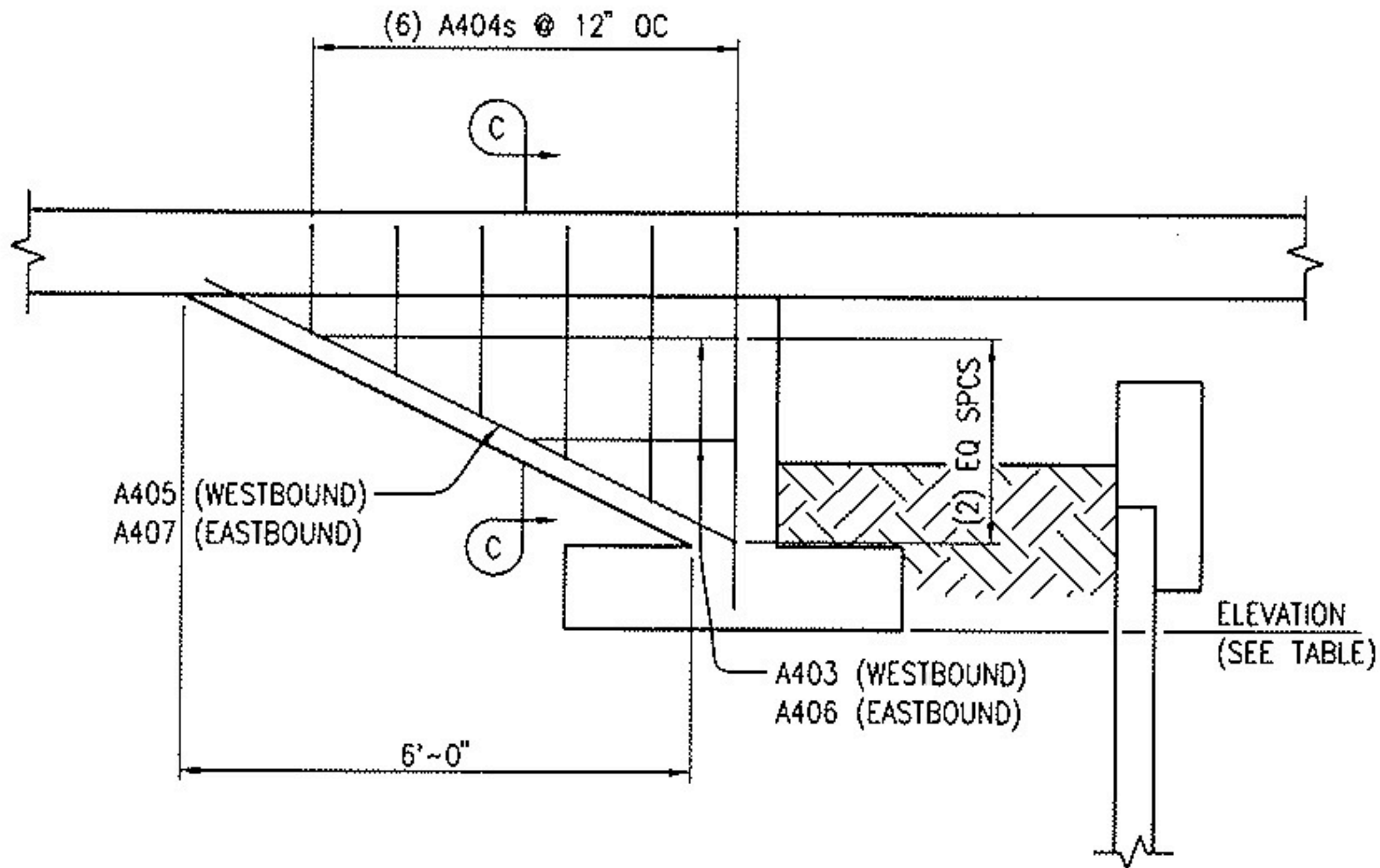
Span 1 Cast,
Forming Approach Slab

September 25, 2008



Span 1 Slope Issue

September 26, 2008



Elevation of Abutment 1

September 9, 2008



South Approach Slab Railing Issue / Light Post attached to MSE Wall
September 27, 2008



Eastmost Girder Pedestrian Railing Issue

September 25, 2008



Profile

September 27, 2008



South Approach Slab

September 30, 2008



Casting remaining curb, Formwork removed on Span 1, Utiliducts installed — October 2, 2008



Installing Waterproof Membrane

October 8, 2008



Heaters for warming up
the deck

October 8, 2008



Installing Waterproof Membrane
October 8, 2008



Heating the Curb to
extend the height

October 23, 2008



Railposts Installed

November 10, 2008



Profile

April 14, 2008



Final Walkthrough

June 24, 2009



Final Walkthrough
June 24, 2009



Final Walkthrough
June 24, 2009



Final Walkthrough

June 24, 2009



Final Walkthrough
June 24, 2009



Final Walkthrough
June 24, 2009



Final Walkthrough
June 24, 2009



Final Walkthrough
June 24, 2009



Questions?